

Seeb

WHAT IS CLAIMED IS:

1. A semiconductor laser device comprising:
a plurality of semiconductor laser resonators having light emitting layers of materials different from each other, the semiconductor laser resonators being provided on the same semiconductor substrate so that the light emitting layers lie substantially in parallel to a main surface of the semiconductor substrate, and
a high-resistance region provided between the semiconductor laser resonators.

10

2. The semiconductor laser device according to claim 1, wherein the semiconductor substrate is a GaAs substrate and the light emitting layers of the semiconductor laser resonators contain Group V elements different from each other.

15

3. The semiconductor laser device according to claim 2, wherein the Group V elements are selected from the group consisting of P, As, Sb and N.

get a 20

20

4. The semiconductor laser device according to claim 1, wherein the semiconductor laser resonators are constituted by two resonators having oscillation wavelengths in a red region and an infrared region, respectively.

5. The semiconductor laser device according to claim 4, wherein the semiconductor substrate is a GaAs substrate, and the resonator having an oscillation wavelength in a red region includes a light emitting layer formed of

an InGaP based material and the resonator having an oscillation wavelength in an infrared region includes a light emitting layer formed of a GaAs based material.

5 6. The semiconductor laser device according to claim 1, wherein the light emitting layers of the semiconductor laser resonators lie at substantially the same distance from the main surface of the semiconductor substrate.

10 7. The semiconductor laser device according to claim 1, wherein the semiconductor laser resonators each have a refractive index wave - guiding structure.

15 8. The semiconductor laser device according to claim 1, wherein the high resistance region is formed as a sufficient air gap for electrically isolating adjacent semiconductor laser resonators.

20 9. The semiconductor laser device according to claim 1, wherein the high resistance region is formed as a high - resistivity semiconductor layer having a sufficient resistance for electrically isolating adjacent semiconductor laser resonators.

25 10. The semiconductor laser device according to claim 9, wherein the high resistivity semiconductor layer is formed by implanting a proton or a gallium ion.

11. The semiconductor laser device according to claim 1, which is incorporated in a recording and reproducing apparatus capable of performing recording and reproduction for both a CD and a DVD.

5 12. A method of manufacturing a semiconductor laser device comprising the steps of:

forming a first semiconductor laser resonator having a light emitting layer of a predetermined material on a semiconductor substrate so that the light emitting layer lies substantially in parallel to a main surface of the 10 semiconductor substrate;

providing an opening in parallel with the main surface of the semiconductor substrate adjacently to the first semiconductor laser resonator;

forming a second semiconductor laser resonator having a light emitting layer of a material different from the material of the first 15 semiconductor resonator in the opening so that the light emitting layer lies substantially in parallel to the main surface of the semiconductor substrate; and

forming a high resistance region between the first and second semiconductor laser resonators.

20 ~ 13. A method of manufacturing a semiconductor laser device comprising the steps of:

forming a first semiconductor laser resonator having a light emitting layer of a predetermined material on a semiconductor substrate so that the 25 light emitting layer lies substantially in parallel to a main surface of the

semiconductor substrate;

forming a stripe-shaped groove in parallel to the main surface of the semiconductor substrate adjacently to the first semiconductor resonator;

5 forming a high-resistivity semiconductor layer on a wall surface and on a bottom surface of the stripe-shaped groove;

forming a current path on a part of the high-resistivity semiconductor layer; and

10 forming a second semiconductor laser resonator having a light emitting layer of a material different from the material of the first semiconductor laser resonator in the stripe-shaped groove so that the light emitting layer lies substantially in parallel to the main surface of the semiconductor substrate.

14. The method of manufacturing a semiconductor laser device according to claim 12, wherein semiconductor layers of at least one of the semiconductor laser resonators are partially removed to form a ridge type waveguide stripe during forming the semiconductor laser resonators.

15. The method of manufacturing a semiconductor laser device according to claim 13, wherein semiconductor layers of at least one of the semiconductor laser resonators are partially removed to form a ridge type waveguide stripe during forming the semiconductor laser resonators.

25

Add (4)

odd
03 >